CLAIM AMENDMENTS

Claims 1 through 18 (canceled)

19. (New) An isolated nucleic acid sequence from the ATI region of modified vaccinia Ankara virus that includes at least one restriction enzyme recognition site as an insertion site for a heterologous sequence and that hybridizes under stringent conditions to the nucleic acid sequence of SEQ ID NO:1 or its complementary strand, said nucleic acid sequence capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency.

20. (New) The nucleic acid sequence defined in claim 19 that includes as the insertion site an ECORI site corresponding to position 1063 of SEQ ID NO:1 that hybridizes under stringent conditions to the nucleic acid sequence of SEQ ID NO:1 or its complementary strand.

21. (new) An isolated fragment of a nucleic acid sequence from the ATI region of modified vaccinia Ankara virus consisting essentially of at least 200 base pairs of the nucleic acid sequence that is SEQ ID NO:1, that is at least 70% homologous to SEQ ID NO:1 and that includes at least one restriction enzyme recognition site as an insertion site for a heterologous sequence,

said isolated fragment of a nucleic acid sequence capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency .

22. (New) The isolated fragment of a nucleic acid sequence defined in claim 21 that includes as the insertion site an ECORI site corresponding to position 1063 of SEQ ID NO:1.

23. (New) A vector for integration of a heterologous sequence into the ATI region of an orthopoxviral genome having an ATI region, said vector including an isolated nucleic acid sequence from the ATI region of modified vaccinia Ankara virus that includes at least one restriction enzyme recognition site as an insertion site for a heterologous nucleic acid sequence, that hybridizes under stringent conditions to the nucleic acid sequence of SEQ ID NO:1 or its complementary strand, and that is capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency.

24. (New) The vector defined in claim 23 wherein additionally at least one transcriptional control element is included in the insertion site.

25. (New) The vector defined in claim 23 wherein the insertion site is the restriction site ECOR1.

26. (New) The vector defined in claim 24 wherein the at least one transcriptional control element is obtained from a poxvirus genome or is a consensus sequence from a poxvirus genome.

27. (New) The vector defined in claim 23 further comprising at least one heterologous sequence inserted within the insertion site, said heterologous nucleic acid sequence functionally associated with a transcriptional control element thereof.

28. (New) The vector defined in claim 27 wherein the heterologous nucleic sequence is selected from the group consisting of marker genes, therapeutic genes, host range genes and genes encoding immunogenic epitopes.

29. (new) The vector defined in claim 27 comprising a recombinogenic sequence, which flanks one or more heterologous sequences encoding marker genes, host range genes, and/or a transcriptional element thereof.

30. (New) A vector for integration of a heterologous sequence into the ATI region of an orthopoxviral genome having an

ATI region, said vector including an isolated fragment of a nucleic acid sequence from the ATI region of modified vaccinia Ankara virus consisting essentially of at least 200 base pairs of the nucleic acid sequence that is SEQ ID NO:1, that is at least 70% homologous to SEQ ID NO:1 and that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence, said isolated fragment of the nucleic acid sequence capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency.

31. (New) The vector defined in claim 30 wherein additionally at least one transcriptional control element is included in the insertion site.

32. (New) The vector defined in claim 30 wherein the insertion site is the restriction site ECOR1.

33. (New) The vector defined in claim 31 wherein the at least one transcriptional control element is obtained from a poxvirus genome or is a consensus sequence from a poxvirus genome.

34. (New) The vector defined in claim 30 further comprising at least one heterologous sequence inserted within the insertion site, said heterologous nucleic acid sequence functionally associated with a transcriptional control element thereof.

35. (New) The vector defined in claim 34 wherein the heterologous sequence is selected from the group consisting of marker genes, therapeutic genes, host range genes and genes encoding immunogenic epitopes.

36. (New) The vector defined in claim 34 comprising a recombinogenic nucleic acid sequence, which flanks one or more heterologous sequences encoding marker genes, host range genes, and/or a transcriptional element thereof.

37. (New) A recombinant orthopoxvirus having an ATI region, comprising in its ATI region an integrated heterologous nucleic acid sequence wherein said integrated heterologous nucleic acid sequence does not interfere with viral propagation and/or replication efficiency.

38. (New) The recombinant orthopoxvirus defined in claim 37 wherein the orthopoxvirus is selected from the group consisting of a modified vaccinia Ankara virus, vaccinia virus Western Reserve, and vaccinia virus Copenhagen.

39. (New) The recombinant orthopoxvirus defined in claim 37 wherein the orthopoxvirus is the modified vaccinia Ankara virus.

40. (New) The recombinant orthopoxvirus defined in claim 37 wherein the heterologous sequence integrated into the orthopoxvirus in its ATI region is from the ATI region of modified vaccinia Ankara virus.

41. (New) The recombinant orthopoxvirus defined in claim 40 wherein the orthopoxvirus is selected from the group consisting of a modified vaccinia Ankara virus, vaccinia virus Western Reserve, and vaccinia virus Copenhagen.

42. (New) The recombinant orthopoxvirus defined in claim 40 wherein the orthopoxvirus is the modified vaccinia Ankara virus.

43. (New) A recombinant orthopoxvirus comprising an ATI region including an integrated heterologous sequence wherein said recombinant orthopoxvirus is obtained by a method comprising the steps of:

(a) transducing a host cell with a vector which comprises an isolated nucleic acid sequence from the ATI region of modified vaccinia Ankara virus that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence, that hybridizes under stringent conditions to the nucleic acid sequence of SEQ ID NO:1 or its complementary strand, and that is capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency, and at least one heterologous sequence inserted within the insertion site;

(b) infecting said host cell with an orthopoxvirus having an ATI region;

(c) integrating the heterologous sequence into the ATI region of the orthopoxvirus by homologous recombination between the nucleic acid sequence and a corresponding genomic sequence of the orthopoxvirus to obtain a recombinant orthopoxvirus; and

(d) isolating said recombinant orthopoxvirus.

44. (New) A recombinant orthopoxvirus comprising an ATI region including an integrated heterologous sequence wherein said recombinant orthopoxvirus is obtained by a method comprising the steps of:

(a) transducing a host cell with a vector which comprises an isolated fragment of a nucleic acid sequence from the ATI region of modified vaccinia Ankara virus consisting essentially of at least 200 base pairs of the nucleic acid sequence that is SEQ ID NO:1, that is at least 70% homologous to SEQ ID NO:1 and that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence, said isolated fragment of the nucleic acid sequence capable of integration of the heterologous sequence through homologous recombination into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency and at least one heterologous sequence inserted within the insertion site;

(b) infecting said host cell with an orthopoxvirus having an ATI region;

(c) integrating the heterologous sequence into the ATI region of the orthopoxvirus by homologous recombination between the isolated fragment of the nucleic acid sequence and a corresponding genomic sequence of the orthopoxvirus to obtain a recombinant orthopoxvirus; and

(d) isolating said recombinant orthopoxvirus.

45. (New) A recombinant orthopoxvirus comprising an ATI region including a heterologous sequence wherein said recombinant orthopoxvirus is obtained by a method comprising the steps of:

(a) transducing a host cell with a vector which comprises an isolated nucleic acid sequence according to SEQ ID NO:1 or its complementary strand from the ATI region of modified vaccinia Ankara virus that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence, and that is capable of integration of the heterologous sequence into the ATI region of an orthopoxvirus without interfering with its viral propagation or replication efficiency, and at least one heterologous sequence inserted within the insertion site;

(b) infecting said host cell with an orthopoxvirus having an ATI region;

(c) integrating the heterologous sequence into the ATI region of the orthopoxvirus by homologous recombination between the nucleic acid sequence and a corresponding genomic sequence of the orthopoxvirus to obtain a recombinant orthopoxvirus; and

(d) isolating said recombinant orthopoxvirus.

46. (New) A method of integrating a heterologous sequence into the ATI region of an orthopoxvirus to obtain a recombinant orthopoxvirus which comprises the steps of:

(a) transducing a host cell with a vector comprising an isolated nucleic acid sequence from the ATI region of modified vaccinia Ankara virus that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence that hybridizes under stringent conditions to the nucleic acid sequence of SEQ ID NO:1 or its complementary strand, and that is capable of integration of the heterologous sequence into the ATI region of the orthopoxvirus through homologous recombination without interfering with its viral propagation and replication efficiency, and at least one heterologous sequence inserted within the insertion site;

(b) infecting said host cell with an orthopoxvirus having an ATI region;

(c) integrating the heterologous sequence into the ATI region of the orthopoxvirus by homologous recombination between the nucleic acid sequence and a corresponding genomic sequence of the orthopoxvirus to obtain a recombinant orthopoxvirus; and

(d) isolating said recombinant orthopoxvirus.

47. (New) The method of integrating a heterologous sequence into the ATI region of the orthopoxvirus defined in claim 46 wherein according to step (b) the orthopoxvirus is modified vaccinia Ankara virus.

48. (New) A method of integrating a heterologous sequence into the ATI region of an orthopoxvirus to obtain a recombinant orthopoxvirus which comprises the steps of:

(a) transducing a host cell with a vector comprising an isolated fragment of a nucleic acid sequence from the ATI region of modified vaccinia Ankara virus consisting essentially of at least 200 base pairs of the nucleic acid sequence that is SEQ ID NO:1, that is at least 70% homologous to SEQ ID NO:1 and that includes at least one restriction enzyme recognition site as an insertion site for the heterologous sequence, said isolated fragment of the nucleic acid sequence capable of integration of the heterologous sequence into the ATI region of an orthopoxvirus through homologous recombination without interfering with its viral propagation or replication efficiency and at least one heterologous sequence inserted within the insertion site;

(b) infecting said host cell with an orthopoxvirus having an ATI region;

(c) integrating the heterologous sequence into the ATI region of the orthopoxvirus by homologous recombination between the isolated fragment of the nucleic acid sequence and a corresponding

genomic sequence of the orthopoxvirus to obtain a recombinant orthopoxvirus; and

(d) isolating said recombinant orthopoxvirus.

49. (New) The method of integrating a heterologous sequence into the ATI region of the orthopoxvirus defined in claim 48 wherein according to step (b) the orthopoxvirus is modified vaccinia Ankara virus.

50. (New) A target cell comprising the recombinant orthopoxvirus defined in claim 37.

51. (New) A pharmaceutical composition for effecting an immune response against an infectious disease or a proliferative disorder which consists essentially of a therapeutically effective amount of the recombinant orthopoxvirus as defined in claim 37 and in a form capable of producing an immune response against an infectious disease or a proliferative disorder in combination with a pharmaceutically acceptable inert carrier or diluent.

52. (New) A method of effecting an immune response against an infectious disease or a proliferative disorder in an animal subject which comprises the step of administering to said subject a therapeutically effective amount of the pharmaceutical composition defined in claim 51.